

**Discussion and Notes**

*Please call or e-mail Flinn Scientific if you have questions or concerns about possible "mystery substances" in your chemical storeroom. Our staff scientists will gladly "walk you through" a procedure to help you identify substances and prevent accidents.*

*Flinn Scientific has a chemical labeling software program that contains a database of almost 1000 chemical labels. See page 1009 of the 2007 Flinn Scientific Catalog/Reference Manual for a detailed description.*

## Chemical Labeling

The chemical label is an important and often-overlooked safety aid. To prevent possible accidents, a responsible science teacher will always take the time to read the name of the chemical on the bottle and briefly review the safety warnings before using any chemical.

The overall safety profile of your school will be greatly improved if you adopt and follow written specifications for chemical labeling. Your goal is to establish uniformity so that chemical safety information can be easily read and understood in a matter of seconds.

### Teacher-Prepared Chemical Solutions

Proper labeling of teacher-prepared chemical solutions is important for two reasons. First, a clear and concise label allows a solution to be easily identified and then safely used by all teachers. Secondly, properly labeling solutions when they are prepared can save your school hundreds of dollars in future disposal fees for potential "mystery substances." Most common mystery substances that we get calls about every day are simply chemical solutions that teachers have made and either did not label or did not label securely, so the label has fallen off or worn off.

State and federal OSHA organizations have stated that chemical labels must include "the specific physical or health hazard(s) including target organs affected." Based on OSHA rules, we suggest the best approach to proper chemical labeling is to list four items on the container label.

1. Chemical Name—Spell out the name correctly and completely. Avoid using abbreviations or chemical formulas.
2. Concentration—If the chemical is in solution, indicate the solution's molarity or strength.
3. Hazards—List in clear terms how the chemical can hurt you and what target organs would be affected. This information can easily be found on the MSDS. Avoid numerical or alphabetical codes that are easily forgotten. Use words that everyone will understand!
4. Date Prepared—Knowing the date the chemical was prepared is very important, especially for those chemicals that have a limited shelf life or form hazardous by-products over time.

For example, let's say you just prepared a 6 M hydrochloric acid solution. The label should read:

**Hydrochloric Acid**  
**6 M solution**  
**Corrosive to all body tissue, especially skin and eyes.**  
**Avoid all body contact.**  
**2007**

Additional information, such as the Flinn Compatible Family Storage Code, CAS number, NFPA code, the initials of the person who prepared the solution, and the lab that uses the solution may also be helpful if there is room on the label.

Any chemical label that you write today may need to be on the chemical container for years to come. Never use a grease pencil or write directly on the bottle or container—use a permanent marker on label paper that has a good adhesive backing. Print clearly so everyone can read and understand the label.

## Labeling Specifications for Purchased Chemicals

A well-written and designed chemical label will reduce accidents and may even save lives. For middle school and high school science labs, certain information should be provided on the bottle or container labels for all purchased chemicals. The following information is required:

- ◆ Chemical name, formula, grade, purity, and concentration
- ◆ Hazard alert
- ◆ Warning information
- ◆ Safety guide identifying personal protective and emergency equipment that should be available when the chemical is used
- ◆ First aid procedures
- ◆ Lot number
- ◆ Storage information, including compatible chemical storage family
- ◆ Suggested disposal procedure
- ◆ Shelf life
- ◆ Solubility
- ◆ Date purchased
- ◆ CAS Number
- ◆ NFPA Code

A consistent labeling system makes proper storage and maintenance of your chemical inventory much easier.

Within the past year, several companies have started to use trilingual chemical labels written in English, French, and Spanish. Many customers have commented how difficult these labels are to read and understand. Important safety information is difficult to find due to the three different languages. Trilingual labels cause unnecessary confusion! We urge you to avoid purchasing products with trilingual chemical labels.

A sample chemical label for hydrochloric acid is provided. Please note on the label where key information is found and how easily the information can be read and understood. Read the name of the chemical, its hazard alert, and the safety warning. Notice that in less than 15 seconds you know the hazards associated with this chemical. Isn't it worth 15 seconds of time to avoid or prevent a chemical accident?

## Flinn Scientific Values Your Support

Flinn Scientific has provided your Science Department Safety Training Notes. Without your orders, the safety training notes and the indispensable *Flinn Scientific Catalog/Reference Manual* would not be possible. Please continue to support our efforts to improve safety in school science labs by sending Flinn Scientific your valuable orders.

## Next Month's Topic

### Handling Live Animals in the Classroom



P.O. Box 219 • Batavia, IL 60510  
(800) 452-1261 • Fax (866) 452-1436  
Web Site: [www.flinnsci.com](http://www.flinnsci.com) • E-mail: [flinn@flinnsci.com](mailto:flinn@flinnsci.com)

# THE FLINN CHEMICAL SAFETY LABEL REDUCES CHEMICAL ACCIDENTS

The FLINN chemical safety label has been specifically designed to fit the needs of middle school and high school science teachers. How should I properly store my chemicals? What safety aids should be available to me when using the

chemical? Is the chemical hazardous? How toxic is toxic? What is the shelf life of the chemical? How do I safely dispose of the chemical? These questions plus many more are answered by the Flinn chemical safety label.

**AT-A-GLANCE  
CHEMICAL SAFETY GUIDE™**

HEALTH	FLAMMABILITY	REACTIVITY	EXPOSURE	STORAGE
<b>3</b>	<b>0</b>	<b>2</b>	<b>3</b>	<b>3</b>
RADICAL	NONE	CONSIDERABLE	RADICAL	CABINET

**DANGER!** Severely corrosive to all body tissues. Highly toxic by ingestion. Avoid contact with skin, eyes and mucous membranes. Avoid contact with oxidizing agents. Contact with metals may produce hydrogen and a possible explosion. Use only under a fume hood. Fumes are a severe respiratory hazard. TLV: 5 ppm.

**FIRST AID:** External: Flush affected area with water. Internal: See a physician at once. Eyes: Flush with water for 15 minutes. See a physician.

© 2007 Flinn Scientific, Inc.  
Batavia, IL 60510 U.S.A.

**FLINN SCIENTIFIC INC.**  
"Your Safer Source for Science Supplies"

H0006

2.5 liters

**HYDROCHLORIC ACID**  
ACS reagent, 12 Molar, assay 37%,  
HCl, F.W. 36.46, PVC coated

★**HAZARD ALERT:** Highly toxic by ingestion or inhalation; severely corrosive to skin and eyes.

**CORROSIVE TO BODY TISSUE**

**7 LOT: 1 2 5 3 4**

**8 STORAGE:** Inorganic #9 in a dedicated acid cabinet. If an acid cabinet is not available store in a Flinn Saf-Cube®. This product continuously fumes—particularly in a warm, moist environment. This substance is singly responsible for destroying many school storage shelves and cabinets. The product deserves special storage attention.

INORGANIC #9 I

**9**

**10 DISPOSAL:** #24b

**11 SHELF LIFE:** Good if stored safely.

**12 SOLUBLE:** Water.

**13 CAS NO:** 7647-01-0

**14 UN1789**

**15 NFPA**

H	3	0	R
---	---	---	---

**16**

FLINN SCIENTIFIC, INC.

PURCHASED  
2007

BATAVIA, ILLINOIS

## 1 Product Name, Quality, Concentration, etc.

Full chemical name is shown and sometimes a common alternative name. The chemical formula and formula weight are immediately below the name. The quality of the substance (e.g., reagent, laboratory grade, etc.) is clearly indicated.

## 2 Hazard Alert

Hazard data is provided to alert the science teacher to the hazardous nature of each chemical. This information is helpful when you are storing, dispensing, or using the product.

## 3 Large Hazard Warning

A large, brief, and specific hazard warning is also shown. This single-line, boldface warning summarizes the most significant hazardous property of the substance.

## 4 At-A-Glance Chemical Safety Guide™

The At-A-Glance Guide™ provides a numerical guide (3 most hazardous; 0 little hazard) in five categories: health, flammability, reactivity, human exposure, and storage. In addition the guide, through the use of pictorials, alerts the teacher about safety aids that are suggested to be available when handling this substance: e.g., gloves, goggles, apron, etc.

## 5 Warning Information

Warning information is concise and easy to understand. The warnings provided are an extension of the safety information provided in the hazard alert. Specific warnings, conditions to avoid, toxicity levels, incompatibility, plus other safety information are provided.

## 6 First Aid

Basic first aid recommendations are provided. Always seek professional medical assistance whenever injury takes place in the laboratory.

## 7 Lot Number

The fingerprint of the chemical you have purchased. A series of numbers identifies for Flinn Scientific what the chemical is, how it was packaged, when it was packaged, who the chemical manufacturer is, etc. Lot numbers are a very important part of any chemical label!

## 8 Flinn Storage Method/Number

Numbers refer to the compatible chemical family in which this item should be stored. For example: Inorganic #9 refers to the family that includes all inorganic acids except for nitric acid. A detailed table of these families and even their most compatible shelf order will be found on pages 1073–1077 of the 2007 Flinn Scientific Catalog/Reference Manual. Please refer to those reference pages.

## 9 Storage Method/Number, Enlarged

The Flinn compatible family storage number is enlarged so you can easily locate and return the chemical container to its proper storage location.

## 10 Suggested Disposal Method

Suggested disposal techniques for small, laboratory quantities of chemicals are provided in the 2007 Flinn Scientific Catalog/Reference Manual on pages 1083–1105. The number shown in the chemical listing refers you to a specific and suggested disposal method for that particular product.

## 11 Shelf Life

A general statement about anticipated shelf life. Since conditions vary widely, the statement is general and should be accepted in that context. The shelf life data are based on exhaustive literature searches.

## 12 Soluble

In what solvent(s) is this substance soluble? We have listed the common solvents. Limited space may, in a few cases, prevent us from listing all of the possible solvents.

## 13 Chemical Abstract Service Registry Number (CAS)

CAS means Chemical Abstract Service. The CAS number is the single identifying number for each specific substance.

## 14 UN Number

The UN (United Nations) number is a worldwide identifying number for a substance in commerce or transport. This number is meaningful to shippers and hazardous material handlers.

## 15 NFPA Code

To protect the professional firefighter, NFPA (National Fire Protection Association) has established a numerical code that rates chemicals *under fire conditions* in four categories: health, flammability, reactivity and unusual reactivity. Within each category a numerical rating system has been established in five numerical ratings (0–4). Number 4 is a severe hazard and number 0 is no special hazard. This rating system is on our label because a few state laws require it. Unfortunately, the NFPA numerical ratings exist for a very limited number of chemicals and the numbers represent hazard *under fire conditions* as opposed to normal laboratory use.

## 16 Date Labeling

Every substance is date labeled. Date labeling was pioneered by Flinn. Current science teachers and their successors are assured that the age of chemicals purchased from Flinn is not a mystery.

**Discussion and Notes**

## Chemical Labeling

The chemical label is a valuable safety aid. A responsible science teacher must take the time to read the name of the chemical on the bottle and to review the safety information regarding the use of the chemical. This month's safety notes discuss what is required for a teacher to make a chemical label and what labeling specifications should be established for the safe purchase of laboratory chemicals. A properly designed chemical label can help prevent future chemical accidents.

This safety meeting should take 6–8 minutes to present. The discussion period will vary depending on the issues that need to be addressed.

It is very important to keep these safety notes and a signed attendance sheet to verify that regular safety training meetings were held. The sign-up sheet is almost as important as the meeting notes and is usually the first thing that is reviewed by regulatory inspectors. A copy of the sign-up sheet we suggest using can be found at [www.flinnsci.com/Sections/Safety/SNotes/signup.pdf](http://www.flinnsci.com/Sections/Safety/SNotes/signup.pdf).

### Materials (one per staff member)

- ◆ Flinn Scientific Science Department Safety Training Notes, Volume 7–6
- ◆ Sample Label for Hydrochloric Acid
- ◆ Sign-up sheet (one for group)

### Additional Questions for Discussion

1. Review the chemical labeling procedures your department currently uses.
2. Discuss the benefits of and need for uniform, consistent, department-wide chemical labeling requirements.
3. Should the school purchase chemical labeling software?
4. Schedule an inspection of the chemical storeroom to check for unlabeled or improperly labeled bottles to identify chemicals before they become tomorrow's mystery substances.

### We Welcome Your Comments

Are the Science Department Safety Training Notes useful to you? Are they working for you and your department? We would love to hear from you if you have any suggestions for topics that you would like to see covered or for how we can improve these safety training notes. Please e-mail us with your comments and suggestions. Our e-mail address is [flinn@flinnsci.com](mailto:flinn@flinnsci.com).